Sex Differences in Tyrosine Hydroxylase Expression in Mouse A1 and A2 Nuclei
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Women are approximately twice as likely to develop a mood disorder in their lifetime compared to men. Differences in their norepinephrine (NE) systems have been studied by targeting the enzyme responsible for catalyzing the conversion of tyrosine to dopa: tyrosine hydroxylase (TH). Although previous studies have supported the theory of a sex differential component, there is a lack of replication of this research in multiple NE neuron subpopulations. Because stressful stimuli cause increased activity in the hypothalamic-pituitary-adrenocortical (HPA) axis of A1 and A2 nuclei, we decided to explore these two hindbrain NE neuron clusters. We utilized transgenic mouse models that express GFP under the control of the Dbh promoter so that all NE neurons express GFP. Immunohistochemistry was performed to visualize these NE neurons as well as all neurons that contain TH. We found that TH expression in the A1 nuclei was significantly higher in males, while no significant difference in TH expression was observed in the A2 nuclei. As this was opposing to our prediction that TH expression would be higher in females, which was based on similar studies in a different NE neuron subpopulation, further experimentation is needed to clarify the significance of this finding.